



Regional Office

33 Boston Post Road
West, Suite 340
Marlborough, MA 01752
Phone: 508.229.2270
Fax: 508.229.7737

Corporate Office

1240 Bayshore Highway
Burlingame, CA 94010
Phone: (650) 347-1555
Fax: (650) 347-8789
www.ecc.net

21 December 2007

Mr. Michael Daly
United States Environmental Protection Agency (US EPA)
New England – Federal Facility Superfund Section
Suite 1100 (HBT)
1 Congress Street
Boston, MA 02114-2023

And

Ms. Claudia Sait
Maine Department of Environmental Protection (MEDEP)
Bureau of Remediation & Waste Management
17 State House Station
Augusta, ME 04333

RE: Revised Aquifer Recovery Test Activities at the Eastern Plume, Naval Air Station Brunswick, Maine

Dear Mr. Daly and Ms. Sait:

ECC is pleased to submit this revised plan to complete an aquifer recovery test at the Naval Air Station. As discussed during our June, October and December 2007 Technical Meetings, the aquifer recovery test will include shutting down the four operating extraction wells at the Eastern Plume for approximately 5 to 7 days and collecting data at 23 observation points (i.e., EP-01, EP-02, EP-03, MW-229A, MW-229B, MW-311, EP-04, EP-06, TB-5, EP-09, EP-10, EP-11, EP-12, MW-331, MW-330, MW-308, MW-309B, EP-13, EP-15, P-106, P-128, MW-306, and MW-209) while water elevations return to non-pumping (i.e., steady state) levels. The data collected during the recover test will be used to calibrate the groundwater flow model being developed for the Eastern Plume. The details of the recovery test are provided below.

This plan was revised on the basis of regulator comments received on the draft aquifer recovery test letter issued on 31 October 2007. The responses to comments received from the EPA (dated 14 November 2007) and the MEDEP (dated 16 November 2007) are provided in Attachment A.

Recovery Test

An aquifer recovery test is proposed for overburden hydrogeologic units under the influence of the extraction well system at the Eastern Plume. The objective of the recovery test is to better estimate hydraulic properties of the various units present at the site, in particular the lower sand unit, which contains most of the impacted groundwater at the site. Previous estimates of hydraulic conductivity for the hydrogeologic units underlying Naval Air Station (NAS) Brunswick have been

based on slug test data obtained during the Remedial Investigation and Supplemental Remedial Investigations conducted by E.C. Jordan (1990 and 1991, respectively). The limitations of slug test data are that they estimate the hydraulic conductivity of aquifer materials immediately surrounding the tested well, are greatly affected by well construction characteristics, and do not provide sufficient data to quantify vertical hydraulic conductivity for the stratigraphic units beneath the Eastern Plume. Recovery test data should be able to provide a better estimate of aquifer-scale hydraulic conductivity values and other hydraulic properties, such as transmissivity and storativity. These properties will be estimated by using the groundwater model being developed for the Eastern Plume.

The recovery test will involve the simultaneous shutdown of all four operating extraction wells. Time-recovery data will then be recorded in selected wells and piezometers. This time-recovery data will then be analyzed using the existing numerical ground water flow model currently being developed. The data obtained during this time-recovery test will be used to calibrate the flow model for the Eastern Plume using MODFLOW. For further details on the Eastern Plume groundwater model please refer to the approved Final Groundwater Modeling Work Plan, issued January 2006 (EA Science and Technology).

Pressure transducers (an In-Situ Level TROLLS[®] or similar devices) will be installed at a select group of wells and will be monitored during the recovery test. Transducers will be installed in selected wells (see table below) and water levels will be recorded for a period of time (~12hrs) prior to system shutdown in order to assess and account for fluctuations in water levels while the extraction system is running. Monitoring wells and piezometers selected for monitoring were chosen in order to obtain an adequate data set of recovering water levels that will be used to determine hydraulic properties in the hydrogeologic units beneath the Eastern Plume.

Ideally, observation points should penetrate just one aquifer, and should be located at a radial distance from the extraction well so time-recovery data will fall on a type curve. If more than more one observation point is used, then the second should be in a radial line with the first but at ten times the distance. If more than two wells are used, then they should form two or more radial lines from the extraction well.

Observation points for this recovery test were selected based on the location of each well relative to site extraction wells. The selected observation points have a large portion of their screens in either the lower sand unit or transition unit. In addition, one monitoring well was selected which is located outside the radius of influence of the extraction system will be monitored to account for any change in water levels not attributable to system shutdown (i.e., a background well).

The table below provides the proposed observation points for each extraction well. The locations of the proposed 23 observations points are located on Figure 1.

OBSERVATION WELLS					
Geologic Unit	EW-1	EW-2A	EW-4	EW-5A	Background Well
Lower Sand Unit Wells	EP-01 EP-02 EP-03 MW-229A	MW-311 EP-04 EP-06	EP-09 EP-10 EP-11 EP-12 MW-331	EP-13 EP-15 P-106 P-128	MW-209
Transition Unit Wells	MW-229B	TB-5	MW-330	MW-306	---
Bedrock Wells	---	---	MW-308 MW-309B	---	---

Field conditions, such as access issues, may result in some changes to the actual wells selected for transducer deployment.

Precipitation will be monitored during the recovery test to assess whether rain events may effect the aquifer recovery. For each transducer, the timing interval between measurements will be on a log scale so water level data are collected from each well more frequently at the beginning of the test when elevations will be changing more rapidly.

The duration of the recovery test will be determined based on observed time-recovery data but is expected to last for 5 to 7 days. The test will continue until sufficient recovery data has been collected to delineate values for the hydrogeologic unit constants and to determine whether there are any recharge or barrier boundaries. After consultation with site regulators, the test will be completed and the extraction system will be turned back on, and transducers will be removed from each observation point.

Aquifer Analysis

An existing 3-D groundwater flow model is currently under development. The groundwater model will be used estimate hydraulic conductivity and storativity for the hydrogeologic units beneath the Eastern Plume. The observed recovery data will be used to calibrate the groundwater model. A transient analysis will be completed to simulate the aquifer recovery.

Schedule of Activities

The following is the anticipated schedule of activities during the aquifer recovery test:

- Day 1 – Install transducers in selected wells.
- Day 2 – Turn off extraction system.
- Day 3-6 – Monitor aquifer response.
- Day 6 – Turn on extraction system (the exact timing of the extraction system start-up will be contingent upon the observed aquifer response).
- Day 6 – Collect water level data, remove transducers.

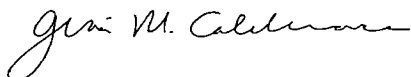
The calibrated groundwater flow model for the Eastern Plume is scheduled to be completed in 2008 and, as outlined in the Final Groundwater Model Work Plan, the results will be summarized in the Groundwater Model Summary Report for the Eastern Plume.

If you have any questions, please do not hesitate to contact us at 508-229-2270.

Regards,
ECC



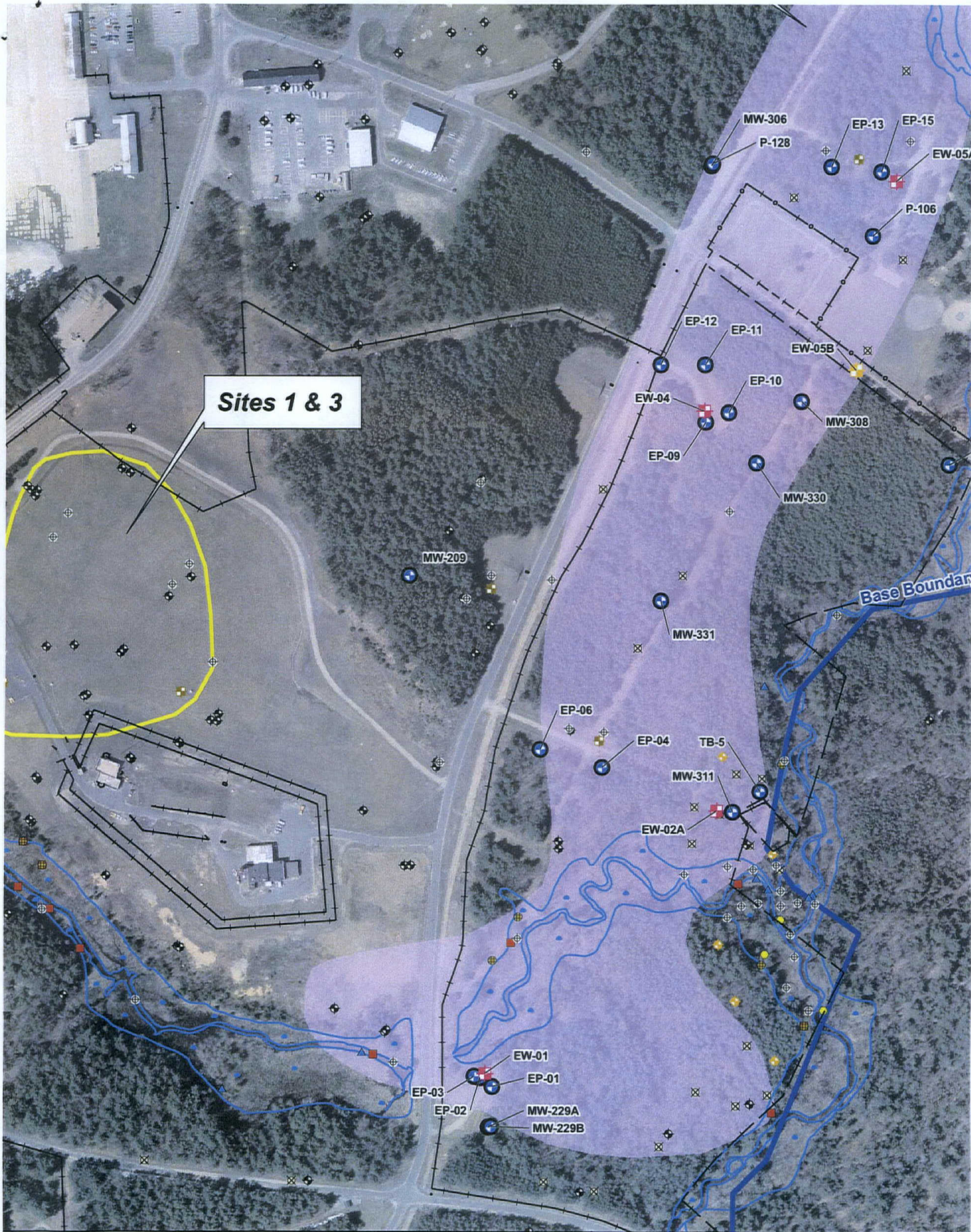
Al Easterday, P.G.
Senior Project Manager



Gina M. Calderone, P.G., C.P.G.
Project Manager/Sr. Hydrogeologist

Copy: (via email)

- C. Evans (MEDEP)
- P. Golonka (Gannett Fleming)
- C. Lepage (BACSE)
- C. Warren (BLRA)
- L. Monaco (Navy)
- D. Kincaid (BRAC PMO)
- D. Barclift (Navy)
- L. Joy (NASB)
- M. Fagan (NASB)
- J. Wright (NAVFAC)
- A. Vandercook (NAVFAC)
- B. Capito (NAVFAC)
- J. Kiker (ECC)
- M. Carver (ECC)
- H. Cavanagh (ECC)
- J. Gatherer (Greenstar)
- Curtis Memorial Library (Admin. Record)



ATTACHMENT A

**RESPONSE TO REGULATOR COMMENTS
AND CONCURRENCE LETTERS**

RESPONSE TO REGULATOR COMMENTS

**RESPONSE TO COMMENTS FROM THE
STATE OF MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION –
BUREAU OF REMEDIATION AND WASTE MANAGEMENT
ON THE DRAFT AQUIFER RECOVERY TEST ACTIVITIES AT THE EASTERN
PLUME, DATED 31 OCTOBER 2007,
NAVAL AIR STATION BRUNSWICK, MAINE**

Commentor: Claudia Sait, MEDEP - Project Manager-Federal Facilities Bureau of Remediation & Waste Management

Comment Issue Date: 16 November 2007	Navy Response Date: 3 December 2007
---	--

Pursuant to Section VI of the Naval Air Station, Brunswick, Maine Federal Facility Agreement (Oct 1990), as amended, the Maine Department of Environmental Protection (MEDEP) has reviewed the draft "Aquifer Recovery Test Activities at the Eastern Plume", dated October 31, 2007, prepared by Environmental Chemical Corporation. Based on that review MEDEP has the following comments and issues.

GENERAL COMMENTS:

1. MEDEP supports the comments submitted by USEPA, particularly the need to include a figure and the relative screen elevations and lengths in the table along with the geologic information. Overall the proposed test methods and expected duration are acceptable and reasonable.

Response: The requested figure and screen elevations have been added to the Revised Letter.

2. Some of the wells listed for the transition unit are screened in the shallow upper sand (MW-229B, MW-332, P-108). These wells will yield a higher conductivity than would be found in the transition unit. MEDEP notes there are limited screens within the transition, as most deeper screens typically target the lower sand where it was found. The wells installed for Mere Brook may provide some screen options truly in the transition, as in several cases a screen was installed between the shallow and deep zone based on depth rather than identification of a permeable unit. If the goal is to obtain better data on the transition, please consider using the middle screen at TB-3N, TB-5 or TB-6, which may be close enough to EW-2A to show measurable change in elevation.

Response: Test boring TB-5 will be monitored instead of MW-332 to monitor aquifer response to the shutdown of extraction well EW-2A in the transition unit.

3. MEDEP suggests inclusion of MW-208, in addition to MW-209, to evaluate conditions upgradient of the extraction well network. Based on the logs for nearby piezometers, such as EP-07 and EP-08, the top of clay is around 80 feet below ground surface. MW-208 is screened 91-101 feet bgs. MW-209 is screened in the upper sand and is not a deep well; therefore calculated hydraulic conductivities may well be higher than expected for the lower sand.

Response: Agree. : It is noted that the primary purpose of the recovery test is to more adequately characterize the hydraulic properties of the lower sand unit and to use this data to calibrate the groundwater flow model for the Eastern Plume which is currently being developed (refer to the Final Groundwater Modeling Work Plan Eastern Plume– EA Engineering January 2006). Monitoring well MW-208 is screened within the clay unit and therefore, it is unlikely that any measurable response will be observed at this location during the recovery test. It is not recommended that MW-208 be added to the list of observation wells to be monitored during the recovery test. As noted however, monitoring well MW-209 is screened in the upper sand unit and is proposed to be used as one of the observation points during the recovery test to account for fluctuations in the water table due to recharge in the aquifer. Currently, this proposed recovery test includes the 4 extractions and 23 observation points.

4. P-108 is screened in the upper sand rather than the transition, and hydraulic conductivities there may be higher than expected for the transition. Based on the boring log, measured hydraulic conductivity at MW-330 would better represent the transition unit. It is screened in the lower part of the transition in sandy clay, with only a few fine sand lenses noted in the screen zone.

Response: Agreed. MW-330 will be monitored instead of P-108.

**RESPONSE TO COMMENTS FROM THE
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND – REGION 1
ON THE DRAFT AQUIFER RECOVERY TEST ACTIVITIES AT THE EASTERN
PLUME, DATED 31 OCTOBER 2007,
NAVAL AIR STATION BRUNSWICK, MAINE**

Commentor: Michael Daly, EPA RPM Federal Facilities Superfund Section	
Comment Issue Date: 14 November 2007	Navy Response Date: 3 December 2007

Pursuant to ' 6 of the Naval Air Station Brunswick, Maine Federal Facility Agreement dated October 19, 1990, as amended (FFA), the Environmental Protection Agency has reviewed the draft "Aquifer Recovery Test Activities at the Eastern Plume", dated October 31, 2007, prepared by Environmental Chemical Corporation. USEPA has the following comments and issues:

GENERAL COMMENTS:

1. Editorial comment: In the future, please include a figure highlighting all the wells to be relied on for the test. Also include a table with extraction well & monitoring well screen depth information.

Response: The requested figure has been added to the Revised Letter.

2. Providing the well is constructed and screened appropriately for purposes of the test, consider adding monitoring well EP-12 to the list of observation wells.

Response: EP-12 has been added to the observation wells.

3. Please consider adding bedrock monitoring well MW-323 to the list of observation wells along with bedrock wells MW-308 and MW-309B.

Response: It is noted that the primary purpose of the recovery test is to more adequately characterize the hydraulic properties of the lower sand unit and to use this data to calibrate the groundwater flow model for the Eastern Plume which is currently being developed. Bedrock is not included in the flow model for the Eastern Plume (refer to the Final Groundwater Modeling Work Plan Eastern Plume– EA Engineering January 2006). Due to monitoring well MW-323's position within bedrock and relative remoteness from any operating extraction well, it is highly unlikely that any changes in water level at MW- 323 would occur due to the shutdown of the extraction well network. Therefore, it is not recommended to include MW-323 as one of the observations wells for this recovery test of the extraction wells. Bedrock wells MW-308 and MW-309B are included as observation wells for this recovery test. Currently, this proposed recovery test includes the 4 extractions and 23 observation points.

4. The specific details and duration of the test appears technically sound for the stated data objectives.

Response: Noted.

CONCURRENCE LETTERS

December 13, 2007

Mr. Orlando Monaco
Department of Navy
Base Realignment and Closure
Program Management Office-Northeast
4911 South Broad Street
Philadelphia, PA 19112-1303

Re: Aquifer Recovery Test-Response to Comments
Naval Air Station, Brunswick, Maine

Dear Mr. Monaco:

MEDEP has reviewed the Navy's responses dated December 06, 2007, to the Maine Department of Environmental Protection (MEDEP) comments, dated November 16, 2007, for the draft "Aquifer Recovery Test Activities at the Eastern Plume" (October 2007). Based on that review MEDEP has no further comments provided the proposed revisions and additions are incorporated into the final report along with regulator comments, responses and this letter.

Please contact me at (207) 287-7713 or claudia.b.sait@maine.gov, if you have any questions or comments.

Respectfully,

Claudia Sait
Project Manager-Federal Facilities
Bureau of Remediation & Waste Management

Cf: File
Mike Fagan-BNAS
Carolyn Lepage-Lepage Environmental
Ed Benedikt
Carol Warren-(email only)
Gina Calderone-ECC (email only)
Jackson Kiker-ECC (email only)

Chris Evans-MEDEP
Mike Daly-EPA
Al Easterday-ECC
Jeff Donovan-ECC (email only)
Helen Cavanagh-ECC (email only)
David Chipman (email only)
Amy Van Dercook (email only)

December 17, 2007 email to Navy from EPA regarding the Response to EPA Comments

Hi Lonnie,

EPA has no additional comments on the workplan.
ECC can proceed with the aquifer test.

Take Care,

Mike Daly.